

RECENT REPORTS OF THE SMITHSONIAN INSTITUTION.¹

THE field of operations of the Smithsonian Institution is so extensive that it is impossible to survey adequately the work carried on in it. The liberality of the Institution has made many students of science acquainted with the researches and results of others, and has placed the whole world of scientific activity under an obligation. In addition, each of the departments under the direction of the Institution is a living centre of investigation, from which contributions to natural knowledge are continually emanating. These departments are the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park and the Astrophysical Observatory.

Following the precedent of several years, Prof. Langley gives, in the body of his report referred to in the footnote, a general account of the affairs of the Institution and its bureaus, while the appendix presents more detailed statements by the persons in direct charge of the different branches of the work. Independently of this the operations of the National Museum are fully treated in a separate volume of the Smithsonian Report, and the Report of the Bureau of American Ethnology constitutes a volume prepared under the supervision of the Director of that Bureau.

Parts of Prof. Langley's report are given below, together with references to some of the contents of the Smithsonian Report for 1899, and the Annual Report of the National Museum, recently received. Two recent reports of the Bureau of Ethnology will be noticed separately.

Astrophysical Researches.—Experiments in the solution of the problem of mechanical flight have been continued, and the Astrophysical Observatory has been active in the investigation of the solar spectrum. The first volume of Annals of the Observatory has been issued. It is devoted primarily, though not exclusively, to the investigation of the infra-red solar spectrum, its absorption lines and its variations in terrestrial absorption. This research, and the development of the sensitive bolographic apparatus with which it has been carried on, have largely occupied the Astrophysical Observatory since its foundation, and are a continuation of researches in which Prof. Langley was engaged for many years at the Allegheny Observatory.

As readers of NATURE are aware, successful observations were made of the solar eclipse of May 28, 1900. A considerable number of photographs of the corona were secured, some of which are upon an unprecedentedly large scale, and these, it is believed, will be of value in investigations of the nature of this still enigmatical solar appendage. A photographic search for hitherto unrecognised objects near the sun developed the fact that even in an ordinary sky, in an eclipse in which the reflected sunlight was brighter than usual, stars as small as the 8.3 magnitude could be secured.

The apparatus employed was designed, not so much for this, however, as for the obtaining evidence of possible intramercutrial planets, but upon this latter point no final opinion can be given. Certain suspicious objects are found on the plates, but unfortunately observations of the same kind at other stations were unsuccessful, so that there is nothing with which to compare them. Studies are still going on, however, and it is possible that this part of the observations may yet yield results of interest.

The delicate and difficult observations upon the heat of the inner corona were made by means of the bolometer, and appear to have been quite successful, being perhaps the first trustworthy observations of the kind; they lend some additional weight to the view that the corona is something analogous to an electric phenomenon.

The Hodgkins Fund.—The different branches of research now progressing under grants from the Hodgkins fund are making satisfactory advances.

Prof. William Hallock, of Columbia University, New York, has supplemented his report of last year by a summary of the further progress of his investigation of the motion of an air

particle under the influence of articulate speech. The instruments which Prof. Hallock has invented, and is now perfecting, have proved a great aid in this research, and will, he states, enable him to settle definitely the question of phase differences in the components of a complex sound.

Prof. A. G. Webster, of Clark University, reports the completion and successful application to the use for which it was designed of the new apparatus, perfected with aid from a Hodgkins grant, by means of which it is now possible to measure the intensity of rapidly varying sounds with an accuracy not hitherto attained. A grant has been made to Prof. Louis Bevier, of Rutgers College, for an investigation of vowel-timbre on the basis of the phonographic record.

The meteorological investigations with kites have been successfully continued at Blue Hill under the direction of Mr. Rotch with the assistance of a grant from the Hodgkins fund. In addition to these investigations, a Hodgkins grant has been made to enable Mr. Rotch to carry on a series of experiments in space telegraphy, it being thought that the unprecedented heights attained by kites might materially extend the range of communication by this method. In the preliminary experiments, however, kites were not used, sufficient elevation being attainable without them, but when the difference between the stations was increased from one mile to three, kites were employed to raise the transmitting and receiving wires. In the later experiments it was found, not unexpectedly, that the long wires, carried up and supported by kites, collected so much electricity as to interfere with and greatly complicate the messages sent from station to station. These interruptions seem to show that the limit of elevation for the receiving wire was under these conditions less than 500 feet. The greatest distance covered in the experiments was approximately twelve miles, from a wire supported by a kite about 200 feet above Blue Hill to the tower of Memorial Hall in Cambridge, which was used as the receiving station. These experiments draw attention to the fact that electrification increases with the altitude to which the wire is carried, and that it is always present, although varying with the meteorological condition of the atmosphere.

Dr. Carl Barus has been given a grant from the Hodgkins fund in aid of his experiments on atmospheric condensation. This research is supplemental to the experiments already conducted by Dr. Barus, as described in *Bulletin* No. 12, of the Department of Agriculture, and will be (1) a study of the origin, activity and growth of the condensation producing dust particles; their reactions on each other, their relation to electric radiation, &c.; (2) a study of the growth, &c., of water corpuscles after condensation; the reaction of corpuscles of different sizes on each other, &c.

A grant has been approved on behalf of Prof. Dr. R. von Lendenfeld, of the University of Prague, for a study of the motion of birds in actual free flight, a subject to which, although primarily known as a zoologist and meteorologist, Dr. von Lendenfeld's attention has been directed for years, and for the better understanding of which he has made numerous anatomical preparations, physiological observations, &c. The investigations of Dr. von Lendenfeld have been aided by the Society for the Advancement of Scientific Research in Bohemia, and also by the Austrian Government.

A grant from the Hodgkins fund has been made to Dr. V. Schumann, of Leipzig, for the prosecution of researches in connection with the spectral relations of atmospheric air. The apparatus by means of which Dr. Schumann has heretofore secured such noteworthy results being chiefly of his own invention, he has been permitted to apply the present grant to the further perfection of his instruments before entering upon his special experiments, which will be definitely reported upon as they progress.

Standards of Colour.—Mr. Robert Ridgway, curator of ornithology in the National Museum, published a number of years ago, for the use of naturalists, a handbook on colour, and he requested a grant from the Institution for a new edition. It appeared to Prof. Langley that a work upon a more extended scale and a somewhat different plan would be of value primarily to naturalists, but also in every department of science, to artists, and in many branches of industry.

At the present time there is practically no uniformity in the common use of colour names, one name designating, as a rule, as many as half a dozen different shades; nor is there any absolute method commonly available by which a person in one place can

¹ Report of Prof. S. P. Langley, secretary of the Smithsonian Institution, for the year ending June 30, 1900. Pp. iv + 117.

Annual Report of the Board of Regents of the Smithsonian Institution for the year ending June 30, 1899. Pp. lxiii + 672.

Report of the U.S. National Museum for the year ending June 30, 1899. Pp. xv + 598. (Washington: Government Printing Office, 1901.)

describte to a person in another the exact shade or tint meant by a given name. The production of a work which would obviate these difficulties and make available what might be called the "constants of nature" in colour, is directly in line with previous publications of the Institution in endeavouring to establish standards whereby a definite nomenclature in scientific and popular writing might be introduced.

Prof. Langley, after consulting with others expert in the matter, decided that it would be desirable, not only to secure more permanent tints, but to connect every tint published in the book with some definite wave-length in the spectrum, whether the solar spectrum or a composite one. The investigations of Prof. Rood and others show that it is difficult to do this directly, but that it can be effected by the use of intermediate means of comparison.

Again, experiments must be made to determine how far this large object (of connecting every tint employed with some definite wave-length or combination of wave-lengths of light) is practicable. If it be fully so, the work may be said to be in one sense something absolutely permanent, relating as it will to standards which can never alter with time, so that, as has been said, those who expect that their writings will be more permanent than the planet itself should take this method of illustrating them. The work promised such magnitude that a committee was appointed, and is now considering the subject.

Collected Papers.—The General Appendix to the Annual Report of the Smithsonian Institution may be termed a "source-book" of scientific history. In consists of reprints and translations of authoritative but popular scientific articles which appeared during the year of the Report. Some are addresses delivered in institutions concerned with the diffusion of knowledge, and others are papers contributed to scientific and other periodicals, and collectively they form an epitome of advance and opinion in all departments of science. There are in the volume before us (1899) no less than thirty papers of this kind, among them being translations of the following: influence of the wave-theory of light on modern physics, by Prof. Cornu; on the sense of smell in birds, by M. X. Raspail; have fishes memory? by Herr L. Edinger; the garden and its development, by Dr. P. Falkenberg; sea-charts formerly used in the Marshall Islands, with notices on the navigation of these islanders in general, by Captain Winkler; the peopling of the Philippines, by Dr. R. Virchow; list of the native tribes of the Philippines and of the languages spoken by them, by Prof. F. Blumentritt; and the sculptures of Santa Lucia Cozumahualpa, Guatemala, in the Hamburg Ethnological Museum, by Herr Herman Strebel.

National Museum.—Details in regard to the work of the U. S. National Museum are given in an appendix to Prof. Langley's report. To the geological collections were added some interesting fossil animals secured from the fields of Wyoming, and a large amount of zoological material was collected in Cuba and Porto Rico. There has also been transferred to the Museum the extensive and very valuable series of vertebrate fossils collected by the late Prof. Marsh during his connection with the United States Geological Survey. This collection aggregated five car-loads, and is particularly rich in specimens of the gigantic Dinosaurs, besides fifty skulls of Titanotherium, probably the best specimens in existence.

The Annual Report of the Museum for 1899 is largely devoted to a description of the collection of non-metallic minerals in the department of applied geology, by Mr. G. P. Merrill. The term non-metallic is used to designate minerals which, as exhibited in the Museum, are utilised in other than metallic forms. The subjects of remaining papers in the Report are:—A Primitive frame for weaving narrow fabrics, and pointed bark canoes of the Kutenai and Amur, by Dr. O. T. Mason; an early West Virginia pottery, by Mr. W. Hough; and a descriptive catalogue of a collection of objects of Jewish ceremonial in U. S. National Museum, by Drs. C. Adler and I. M. Casanowicz.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

DR. G. S. TURPIN, headmaster of the Swansea Intermediate and Technical School, has been appointed to succeed Dr. Gow as headmaster of the Nottingham High School. Particulars as to the vacancy thus caused at Swansea will be found in our advertisement columns.

THE council of University College, London, have appointed Mr. J. D. Cormack, of the University of Glasgow, to the chair

of mechanical engineering in this College, vacant by the resignation of Prof. Hudson Beare on his appointment as regius professor at Edinburgh.

The Education Bill (No. 2), was read a second time in the House of Commons on Tuesday, after a long and animated debate. As a consequence of the Cockerton judgment, the question had to be determined whether School Boards were the proper authorities to deal with secondary education or not; and the Government decided against them. The Bill is the first step towards the establishment of single local authorities connected with County Councils for the control of the whole of the work of secondary education in their districts.

THE Liverpool City Council unanimously adopted the following resolution at a meeting held on July 3:—"That the Council has observed with much satisfaction the growth and progress of the University College, and in view of the fact that the college authorities are taking steps to procure the establishment of a separate University for Liverpool records its opinion that it is desirable in the interests of higher education in the city that such a University should be established." It is understood that, though there has not yet been any appeal to the public, about 100,000*l.* has already been promised for Liverpool University, which will bring up the capital value of University College to about 600,000*l.*, and the promoters are sanguine that there will be little difficulty in raising this to 750,000*l.* The council of University College have elected Dr. E. W. Marchant to the lectureship in electrotechnics vacated by Mr. Alfred Hay's appointment to a professorship at Coopers Hill.

THE University of Birmingham is fortunate in having a strong man like Mr. Chamberlain to plead its cause and advance its interests. At the first congregation of the University, held on Saturday last, he again directed attention to the national importance of higher education and research, and referred to the liberal provision made for work of this kind in other countries. "I am convinced," he said, "that unless we overcome the innate conservatism of our people in regard to the application of the highest science to the commonest industries and manufactures in our land, we shall certainly fall very far behind in the race." Though the fact involved in this statement has been persistently brought forward in *NATURE* for many years, it cannot be too frequently reiterated in public to rouse wealthy citizens to a sense of their responsibilities as regards provision for national progress, and create a higher regard for scientific work than is at present possessed by Englishmen in general. It is not necessary to enlarge here upon the facilities for scientific work abroad, for scarcely a week passes without our having to record munificent donations by States and individuals for the erection of buildings in which such work can be carried on under favourable conditions. Mr. Chamberlain mentioned in his address that the Charlottenburg Technical High School cost half a million of money, and this is but one instance of many. A modern University ought at least to secure an equal sum of money to build and equip its scientific side, especially when the ideals are those sketched by Mr. Chamberlain in the following words:—"I venture to lay down four qualifications as necessary to a perfect University. In the first place, it should be an institution where all existing knowledge is taught. Such a University may, perhaps, never yet have been attained; want of means may always prevent it, but at least that was the object at which we should aim, and we should never rest satisfied until we can say that no student desirous of instruction in any branch of learning shall be turned hungry away from the doors of this University. No doubt the enormous development of knowledge, and especially of its scientific side, during the present century requires a certain specialisation in the teaching of that knowledge, and I think it may be desirable, I think it may be necessary, that Universities also should be specialised, and that one University should pay more attention than another to particular studies; but I believe at the same time that it would be fatal if in our desire as a modern University to give a special development to the practical and thorough teaching of our scientific work, it would be a great mistake, I say, if we were to exclude or to neglect the older branches of learning. Well, then, in the second place a University is a place where the knowledge that has been acquired has to be tested. And as to that I will only say that in the multiplication of examining bodies I hope that nothing will be done, either by us or by our successors, to lower the standards of proficiency, whether in